4th World Congress on Agroforestry

20-22 May 2019
Montpellier, France

Book of Abstracts

L01.P.07

Soil C stocks in the sylvopastoral zone of Senegal as influences by trees

Blanfort V.[1] (vincent.blanfort@cirad.fr), N'Goran A.-J. A.[2], Diouf A. A.[3], Diatta S.[4], Assouma M. H.[2], Djagoun A.[2], Cournac L.[5], Lardy-Chapuis L.[5], Taugourdeau S.[2]

[1] *UMR Selmet, Cirad, Montpellier, France*; [2] *UMR Selmet DP PPZS, Cirad, Dakar, Senegal*; [3] *Centre de Suivi Ecologique, Dakar, Senegal*; [4] *FST Departement Biologie Végétale, UCAD, Dakar, Senegal*; [5] *UMR Ecosol LMI IESOL, IRD, Dakar, Senegal*

Sahelian pastoral livestock systems are criticized for their high intensity of greenhouse gas emissions (CO2, N2O, CH4) per unit of product combined with their negative impact on soil and vegetation degradation caused by the trampling of animals, the overgrazing and the uncontrolled sampling. However, interactions between soil and plants could mitigate this environmental impact by an increase in the levels and stocks of organic carbon (C) in soils. In Senegal, some studies were conducted on the dynamics of C and C stocks in some areas of the pastoral zone (Ferlo). However, these studies did not cover the entire sylvopastoral zone of the Senegal. The main objective of this study is to determine the influence of the woody stratum on the soil C content and to identify the environmental factors influencing the variation of soil C stocks in the sylvopastoral zone of Senegal. Soil were collected in 15 of the soil control sites of the Senegalese Ecological Monitoring Center (CSE). Soil samples were taken outside and under tree crowns for the 0-10 and 10-30 cm soil layers. Sieved soil sample reflectance was measured in the near infra-red range (NIRS) to predict soil C and N contents. The soil bulk density was determined using the core method and soil C stocks calculated. Results showed that C stocks in the 0-30 cm surface layers of these sandy soils varied from 9.29 to 29.72/ 18.51 t.ha-1. Soil contents of C and N were higher under the crowns, and at 0-10 cm deep. In addition, the soil C-to-N ratio was significantly higher under than outside tree crowns. In the sylvopastoral zone of Senegal, the stocks of soil organic C increased along a North-South gradient and were positively influenced by rainfall and leaf biomass of trees. From this study, it appears that the tree impels the increase of the contents of C, N This content is also dependent on the rainfall variability and organic matter production of the vegetation cover in the Sahelian sylvopastoral zone.

Keywords: sahel, Soil Carbon, soil nitrogen, tree.